## BASIS FOR THE AMENDMENT

Claim 9 has been canceled.

New Claim 12 has been added as supported at page 4, lines 17-19 of the specification.

New Claim 13 is supported by Claim 1 and the Examples in the specification. See Table 1 at page 7 of the specification.

No new matter is believed to have been added by entry of this amendment. Entry and favorable reconsideration are respectfully requested.

Upon entry of this amendment Claims 1-7 and 10-13 will now be active in this application.

## REMARKS

Applicants wish to thank Examiner Koslow for the helpful and courteous discussion with Applicants' Representative on October 3, 2007. It was noted that only very small amounts of white pigment give marked increase in color brightness. In addition, the examples of the specification were discussed in detail.

The Examiner stated that additional examples may be helpful. Accordingly, Applicants are providing herewith a **Rule 132 Declaration** with additional data.

The following is intended to expand upon the discussion with the Examiner.

Applicants respectfully request reconsideration of the application, as amended, in view of the following remarks.

The present invention as set forth in **Claim 1** relates to a moulding, comprising:

a plastic matrix which comprises a transparent plastic,

a soluble **fluorescent dye** and

a **scattering agent** whose refractive-index difference from said plastic matrix is +/- from 0.003 to 0.2,

wherein a **white pigment** whose refractive-index difference from said plastic matrix is from +0.4 to 1.5 is also present, at a concentration of from 0.001 to 0.1% by weight.

In **new Claim 13**, the upper limit of the amount of white pigment is 0.0075% by weight.

The present application describes a molding based on **a combination of three elements: a flourescent dye, a scattering agent and a white pigment**. The combination of the three elements shows **synergetic effects** as can be seen from the examples, e.g. **enhancement of the brilliance of colors** of molding compositions. **Only very small amounts of white pigment give marked increase in color brightness.**

The specification discloses in the paragraph bridging pages 1 and 2:

> Surprisingly, the effect of addition of the white pigment at an unusually low concentration is a marked rise in colour brightness. The mouldings of the invention in particular have a reflectance which, measured in % using a spectrophotometer to DIN 5036, is higher by at least 10% than that of a corresponding moulding without white pigment. This rise in brightness in colour is clearly discernible, even by the naked eye.

The present application is concerned with the problem of providing a moulding with improved brightness of color. The examples in the specification, which use the claimed combination of a flourescent dye (see Table 1 at page 7 of the specification), a scattering agent ($BaSO_4$) and a white pigment ($TiO_2$ or ZnS), show clearly that the problem is indeed solved. The improved brightness of color can be observed under daylight conditions D65 (incident light condition) already from visual assessment for all colors in comparison to the mouldings without addition of whitening pigments. The red colored mouldings show increased L*- and a*-values standing for increased brightness and increased red-values. The mouldings colored orange, yellowish green and yellow show even more increased L*-, a*- and b*-values with reflectance-values that are more than 10% increased in comparison to the mouldings without addition of whitening pigments.

Table 2 at page 8 of the specification shows various examples and comparative examples. Examples according to the present invention are marked in **bold letters and use**

**barium sulphate and titanium dioxide (Example No. 144 E uses barium sulphate and zinc sulphide)**. For the composition see Table 1 at page 7 of the specification.

Results:

Tab. 2 CIELAB reflection colour values L, a, b for D65/10° illuminant

| **Exp. No.** | Shade | **$L^*$** | **$a^*$** | **$b^*$** | **Reflectance in %** | **Visual assessment in D65 daylight** |
|---|---|---|---|---|---|---|
| 113T | orange | 56.29 | 23.66 | 94.86 | 24.2 | yellowish-orange fluorescence, somewhat cloudy |
| **144M** | **orange** | **66.10** | **29.80** | **105.55** | **35.5** | **yellowish-orange fluorescence, very bright** |
| 113Q | yellowish green | 62.34 | -31.70 | 80.00 | 30.8 | yellow fluorescence, somewhat cloudy |
| **144K** | **yellowish green** | **70.53** | **-31.21** | **90.56** | **41.5** | **yellow fluorescence, very bright** |
| 113S | red | 34.77 | 60.93 | 59.94 | 8.4 | red fluorescence, somewhat cloudy |
| **144E** | **red** | **37.81** | **65.73** | **59.53** | **10.0** | **red fluorescence, very bright** |
| **144G** | **red** | **37.40** | **64.83** | **58.77** | **9.8** | **red fluorescence, very bright** |
| 148A | yellow | 64.40 | -30.14 | 90.36 | 33.3 | yellow fluorescence, somewhat cloudy |
| **148F** | **yellow** | **72.31** | **-28.77** | **99.64** | **44.1** | **yellow fluorescence, very bright** |

The specification discloses at page 9, 1st paragraph:

> As can be seen from the colour values, and also from visual assessment, the products produced using the barium sulphate/titanium dioxide (zinc sulphide) combination have markedly greater brightness of shade. Red has a higher red value, yellow has a higher yellow value, etc. The improvement is also clearly detectable visually.

Further, the **Rule 132 Declaration** shows **examples according to the present invention accented in bold letters.** Comparative examples are shown in regular (not bold) font.

**Tables 1, 2 and 3** show the amounts of the components used in the respective examples and Comparative examples.

**Tables 4, 5 and 6** show the test results for Hue, L*, a*, b*, Luminosity coefficient and Visual evaluation in D65 daylight.

**The values should be compared only within one set of coloring.** The comparison should be made within the following sets which are listed in order in the Tables.

**Table 1 and 4:**

-113T (comparative) and **144M (according to invention);**

-113Q (comparative) and **144K (according to invention);**

-113S (comparative) and **144G (according to invention);**

-148A (comparative) and **148F (according to invention);**

-780/I/1 (comparative), **780/I/2 (according to invention), 780/I/3 (according to invention)**, 780/I/4 (comparative);

-780/I/5 (comparative), **780/I/6 (according to invention), 780/I/7 (according to invention)**, 780/I/8 (comparative);

-780/I/9 (comparative), **780/I/10 (according to invention), 780/I/11 (according to invention),** 780/I/12 (comparative);

-780/I/13 (comparative), **780/I/14 (according to invention), 780/I/15 (according to invention),** 780/I/16 (comparative).

**Tables 2 and 5:**

**-780/II/1 (according to invention)** and 780/II/5(comparative);

**-780/II/2 (according to invention)** and 780/II/6 (comparative);

**-780/II/3 (according to invention)** and 780/II/7 (comparative);

**-780/II/4 (according to invention)** and 780/II/8 (comparative).

**Tables 3 and 6:**

**-780/III/1 (according to invention)** and 780/III/5(comparative);

**-780/III/2 (according to invention)** and 780/III/6 (comparative);

**-780/III/3 (according to invention)** and 780/III/7 (comparative);

**-780/III/4 (according to invention)** and 780/III/8 (comparative).

**Table 1**

| Test No. | White pigment, titanium dioxide % | Scattering agent, barium sulfate % | Lumogen F Orange 240 % | Lumogen F Yellow 083 % | Lumogen F Red 305 % | Hostasol yellow 3G % |
|---|---|---|---|---|---|---|
| 113T | ---- | 1.0 | 0.05 | | | |
| **144M** | **0.0075** | **1.0** | **0.05** | | | |
| 113Q | ---- | 1.0 | | 0.05 | | |
| **144K** | **0.0075** | **1.0** | | **0.05** | | |
| 113S | ---- | 1.0 | | | 0.05 | |
| **144G** | **0.0075** | **1.0** | | | **0.05** | |
| 148A | ---- | 1.0 | | | | 0.05 |
| **148F** | **0.0075** | **1.0** | | | | **0.05** |
| 780/I/1 | 0.0005 | 1.0 | 0.05 | | | |
| **780/I/2** | **0.0015** | **1.0** | **0.05** | | | |
| **780/I/3** | **0.075** | **1.0** | **0.05** | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 780/I/4 | 0.15 | 1.0 | 0.05 | | | |
| 780/I/5 | 0.0005 | 1.0 | | 0.05 | | |
| **780/I/6** | **0.0015** | **1.0** | | **0.05** | | |
| **780/I/7** | **0.075** | **1.0** | | **0.05** | | |
| 780/I/8 | 0.15 | 1.0 | | 0.05 | | |
| 780/I/9 | 0.0005 | 1.0 | | | 0.05 | |
| **780/I/10** | **0.0015** | **1.0** | | | **0.05** | |
| **780/I/11** | **0.075** | **1.0** | | | **0.05** | |
| 780/I/12 | 0.15 | 1.0 | | | 0.05 | |
| 780/I/13 | 0.0005 | 1.0 | | | | 0.05 |
| **780/I/14** | **0.0015** | **1.0** | | | | **0.05** |
| **780/I/15** | **0.075** | **1.0** | | | | **0.05** |
| 780/I/16 | 0.15 | 1.0 | | | | 0.05 |

**Table 2**

| Test No. | White pigment, titanium dioxide % | Scattering agent, SBX8* % | Lumogen F Orange 240 % | Lumogen F Yellow 083 % | Lumogen F Red 305 % | Hostasol yellow 3G % |
|---|---|---|---|---|---|---|
| **780/II/1** | **0.0075** | **1.0** | **0.05** | | | |
| **780/II/2** | **0.0075** | **1.0** | | **0.05** | | |
| **780/II/3** | **0.0075** | **1.0** | | | **0.05** | |
| **780/II/4** | **0.0075** | **1.0** | | | | **0.05** |
| 780/II/5 | | 1.0 | 0.05 | | | |
| 780/II/6 | | 1.0 | | 0.05 | | |
| 780/II/7 | | 1.0 | | | 0.05 | |
| 780/II/8 | | 1.0 | | | | 0.05 |

*Techpolymer SBX8 of Sekisui, Japan (cross-linked polystyrene)

**Table 3**

| Test No. | White pigment, titanium dioxide % | Scattering agent, polystyrene % | Lumogen F Orange 240 % | Lumogen F Yellow 083 % | Lumogen F Red 305 % | Hostasol yellow 3G % |
|---|---|---|---|---|---|---|
| **780/III/1** | **0.0075** | **1.0** | **0.05** | | | |
| **780/III/2** | **0.0075** | **1.0** | | **0.05** | | |
| **780/III/3** | **0.0075** | **1.0** | | | **0.05** | |
| **780/III/4** | **0.0075** | **1.0** | | | | **0.05** |
| 780/III/5 | | 1.0 | 0.05 | | | |
| 780/III/6 | | 1.0 | | 0.05 | | |
| 780/III/7 | | 1.0 | | | 0.05 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 780/III/8 | | 1.0 | | | | 0.05 |

| White pigment | Scattering agent | Refractive index* |
|---|---|---|
| Titanium dioxide | | 2.70 |
| | Barium sulfate | 1.64 |
| | SBX8 | 1.59 |
| | Polystyrene | 1.58 |

*** from literature and manufacturers' data**

**Refractive index of the PMMA matrix = 1.5**

**Table 4**

**$TiO_2$ as white pigment and $BaSO_4$ as scattering agent**

| Test No. | Hue | L* | a* | b* | Luminosity coefficient in % | Visual evaluation in D65 daylight |
|---|---|---|---|---|---|---|
| 113T | Orange | 57.67 | 18.84 | 58.39 | 25.6 | orange-yellow fluorescing, somewhat cloudy |
| **144M** | **Orange** | **66.32** | **25.02** | **71.06** | **35.74** | **orange-yellow fluorescing, very brilliant** |
| 113Q | Yellow | 63.07 | -27.02 | 58.38 | 31.67 | yellow fluorescing, somewhat cloudy |
| **144K** | **Yellow** | **70.66** | **-27.17** | **69.43** | **41.69** | **yellow fluorescing, very brilliant** |
| 113S | Red | 40.66 | 47.18 | 29.89 | 11.65 | red fluorescing, somewhat cloudy |
| **144G** | **Red** | **42.68** | **51.78** | **31.00** | **12.95** | **red fluorescing, very brilliant** |
| 148A | Yellow | 63.78 | -25.19 | 62.60 | 32.53 | yellow fluorescing, somewhat cloudy |
| **148F** | **Yellow** | **71.19** | **-24.83** | **73.80** | **42.46** | **yellow fluorescing, very brilliant** |
| 780/I/1 | Orange | 63.97 | 18.19 | 68.98 | 32.77 | orange-yellow fluorescing, somewhat cloudy |
| **780/I/2** | **Orange** | **66.65** | **22.12** | **72.21** | **36.17** | **orange-yellow fluorescing, brilliant** |
| **780/I/3** | **Orange** | **81.88** | **33.42** | **85.14** | **60.08** | **orange-yellow fluorescing, pale and brilliant** |
| 780/I/4 | Orange | 86.01 | 34.81 | 86.86 | 68.01 | orange-yellow fluorescing, very pale, not very brilliant |
| 780/I/5 | Yellow | 67.00 | -24.60 | 65.90 | 36.63 | yellow fluorescing, somewhat cloudy |
| **780/I/6** | **Yellow** | **69.38** | **-25.09** | **70.14** | **39.88** | **yellow fluorescing, brilliant** |
| **780/I/7** | **Yellow** | **93.19** | **-26.04** | **104.07** | **83.41** | **yellow fluorescing, pale and brilliant** |
| 780/I/8 | Yellow | 97.21 | -25.48 | 108.88 | 92.95 | yellow fluorescing, very pale, not very brilliant |
| 780/I/9 | Red | 45.27 | 49.12 | 39.22 | 14.73 | red fluorescing, somewhat cloudy |
| **780/I/10** | **Red** | **45.81** | **49.49** | **38.68** | **15.13** | **red fluorescing, brilliant** |
| **780/I/11** | **Red** | **57.49** | **64.60** | **41.16** | **25.43** | **red fluorescing, pale and** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | **brilliant** |
| 780/I/12 | Red | 61.66 | 67.94 | 40.08 | 30.01 | red fluorescing, very pale, not very brilliant |
| 780/I/13 | Yellow | 68.55 | -25.17 | 72.54 | 38.72 | yellow fluorescing, somewhat cloudy |
| **780/I/14** | **Yellow** | **70.12** | **-25.58** | **75.30** | **40.91** | **yellow fluorescing, brilliant** |
| **780/I/15** | **Yellow** | **95.38** | **-26.10** | **106.93** | **88.52** | **yellow fluorescing, pale and brilliant** |
| 780/I/16 | Yellow | 99.37 | -25.31 | 108.38 | 98.37 | yellow fluorescing, very pale, not very brilliant |

**Table 5**

**$TiO_2$ as white pigment and SBX8 beads as scattering agent**

| Test No. | Hue | L* | a* | b* | Luminosity coefficient in % | Visual evaluation in D65 daylight |
|---|---|---|---|---|---|---|
| **780/II/1** | **Orange** | **68.46** | **22.57** | **73.88** | **38.60** | **orange-yellow fluorescing, very brilliant** |
| **780/II/2** | **Yellow** | **75.62** | **-26.17** | **79.67** | **49.27** | **yellow fluorescing, very brilliant** |
| **780/II/3** | **Red** | **49.04** | **54.99** | **41.13** | **17.63** | **red fluorescing, very brilliant** |
| **780/II/4** | **Yellow** | **83.72** | **-27.56** | **95.57** | **63.54** | **yellow fluorescing, very brilliant** |
| 780/II/5 | Orange | 63.52 | 16.57 | 68.21 | 32.22 | orange-yellow fluorescing, somewhat cloudy |
| 780/II/6 | Yellow | 69.02 | -25.67 | 69.33 | 39.37 | yellow fluorescing, somewhat cloudy |
| 780/II/7 | Red | 45.27 | 48.55 | 38.37 | 14.73 | red fluorescing, somewhat cloudy |
| 780/II/8 | Yellow | 69.35 | -26.82 | 73.00 | 39.83 | yellow fluorescing, somewhat cloudy |

**Table 6**

**$TiO_2$ as white pigment and polystyrene as scattering agent**

| Test No. (poly-styrene) | Hue | L* | a* | b* | Luminosity coefficient in % | Visual evaluation in D65 daylight |
|---|---|---|---|---|---|---|
| **780/III/1** | **Orange** | **61.84** | **15.37** | **63.75** | **30.22** | **orange-yellow fluorescing, very brilliant** |
| **780/III/2** | **Yellow** | **68.14** | **-25.72** | **67.35** | **38.16** | **yellow fluorescing, very** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | **brilliant** |
| **780/III/3** | **Red** | **46.26** | **49.91** | **37.77** | **15.46** | **red fluorescing, very brilliant** |
| **780/III/4** | **Yellow** | **68.49** | **-26.95** | **71.44** | **38.65** | **yellow fluorescing, very brilliant** |
| 780/III/5 | Orange | 52.77 | -2.26 | 51.01 | 20.84 | orange-yellow fluorescing, somewhat cloudy |
| 780/III/6 | Yellow | 50.62 | -22.43 | 39.85 | 18.95 | yellow fluorescing, somewhat cloudy |
| 780/III/7 | Red | 41.95 | 41.86 | 33.48 | 12.47 | red fluorescing, somewhat cloudy |
| 780/III/8 | Yellow | 51.77 | -21.92 | 44.60 | 19.94 | yellow fluorescing, somewhat cloudy |

The new examples show that superior properties are obtained when the whitening pigment is used in the claimed amount of 0.001 to 0.1 % by weight.

Below 0.001 % by weight (for example at 0.0005 % by weight) the coloring is too dim. Above the upper limit of 0.1 % by weight (for example at 0.15 % by weight) the coloring is too bright (high L values) which takes away the brilliance.

Close to the upper and lower limits ( for example at 0.0015 and 0.075 %) as well as almost in the middle of the range (0.0075 %) good results are detected throughout.

Beyond the values themselves, the optical evaluation with the human eye under day light conditions (D65) is also important.

Examples with SBX8 light scattering pearls made of cross linked polystyrene and with (not cross linked) polystyrene are presented in addition to $BaSO_4$ as light scattering agent. Notably, as seen in Tables 4, 5 and 6, the examples according to the present invention (**shown in bold**) exhibit superior L*, a*, and b* values, Luminosity coefficient and Visual evaluation in D65 daylight compared to the respective comparative examples.

JP6-67612A (corresponds to EP 0 559 083 A2) and US 6,375,864 (Phillips et al) fail to disclose or suggest the **combinations** of a flourescent dye, a scattering agent and a white

pigment in a polymer matrix and the superior results shown in the examples of the present specification. In the present invention, **very small amounts of white pigment give marked increase in color brightness**. This is not disclosed or suggested in JP6-67612A or US 6,375,864.

JP6-67612A does not recognize that very small amounts of white pigment give superior results. JP6-67612A thinks that all amounts give the same result.

The Examples in the Rule 132 Declaration show that superior properties are obtained when the whitening pigment is used in the claimed amount of 0.001 to 0.1 % by weight.

Below 0.001 % by weight (for example at 0.0005 % by weight) the coloring is too dim. Above the upper limit of 0.1 % by weight (for example at 0.15 % by weight) the coloring is too bright (high L values) which takes away the brilliance.

Close to the upper and lower limits ( for example at 0.0015 and 0.075 %) as well as almost in the middle of the range (0.0075 %) good results are detected throughout.

As discussed above, beyond the values themselves, the optical evaluation with the human eye under day light conditions (D65) is also important.

US 6,375,864 discloses daylight/nightglow colored phosphorescent plastic compositions and articles. Whitening pigments are mentioned as optional additives. Inert fillers are also mentioned as optional additives. However in the 24 examples no whitening pigments and no inert fillers are employed. There are only mixtures of different phosphorescent pigments with daylight phosphorescent dyes. Further, US 6,375,864 do not disclose or suggest that **very small amounts of white pigment give marked increase in color brightness**. The Examples in the Rule 132 Declaration show that superior properties

are obtained when the whitening pigment is used in the claimed amount of 0.001 to 0.1 % by weight.

Below 0.001 % by weight (for example at 0.0005 % by weight) the coloring is too dim. Above the upper limit of 0.1 % by weight (for example at 0.15 % by weight) the coloring is too bright (high L values) which takes away the brilliance.

Close to the upper and lower limits ( for example at 0.0015 and 0.075 %) as well as almost in the middle of the range (0.0075 %) good results are detected throughout.

As discussed above, beyond the values themselves, the optical evaluation with the human eye under day light conditions (D65) is also important.

Notably, in **new Claim 13**, the upper limit of the amount of white pigment is 0.0075% by weight. This is below the amount of 0.01-10% of white pigment disclosed in JP6-67612A and below 0.001 -2 wt% of white pigment disclosed in US 6,375,864.

Therefore, the rejections of Claims 1-7 and 9-11 under 35 U.S.C. § 103(a) over each of JP06-67612 and US 6,375,864 are believed to be unsustainable as the present invention is neither anticipated nor obvious and withdrawal of these rejections is respectfully requested.

The objection to Claims 1 and 11 is obviated by the proper status identifiers provided for these claims.

The rejection of Claim 2 under 35 U.S.C. § 112, 1st paragraph, is traversed.

As set forth at page 4, lines 17-19 of the specification, **titanium dioxide, zinc oxide or zinc sulphide are examples of preferred white pigments**. Accordingly, the language of Claim 2 is appropriate and there is no discrepancy between the claim language and the

specification. Contrary to the Examiners' statement, the definition of the white pigment at page 4 of the specification is not narrower than Claim 2. Since page 4 only refers to some examples, the language of Claim 2 is indeed appropriate. There is no basis for narrowing Claim 2 to the preferred examples of white pigments only. Thus, this rejection should be withdrawn.

The rejection of Claim 9 is moot in view of the cancellation of Claim 9.

This application presents allowable subject matter, and the Examiner is kindly requested to pass it to issue. Should the Examiner have any questions regarding the claims or otherwise wish to discuss this case, he is kindly invited to contact Applicants' below-signed representative, who would be happy to provide any assistance deemed necessary in speeding this application to allowance.

Respectfully submitted,

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